



***MCAS Futenma
Weather Presents.***



Instrument Ground

School

TOPICS:

- ✓ OPNAVINST 3710.7S
- ✓ General Information
- ✓ Meteorological Parameters
- ✓ Avoidance Rules
- ✓ Warnings and Advisories
- ✓ Heat Conditions
- ✓ Tropical Cyclones
- ✓ Weather Briefs

OPNAVINST 3710.7S

- ✓ Chapter 4
- Flight Weather Briefing Requirements
- ✓ Chapter 13
- Weather Requirements for Instrument Rating





General Information

GENERAL INFORMATION

✓ Located in **Building 510**

✓ **24 Hour Service**

✓ **Contact Numbers**

OIC/NCOIC/Admin: 636-3437/3628

Weather Information: 636-3177/3071

Fax: 636-2049

✓ **Website:**

www.futenma.usmc.mil/WXPUBLIC/wxindex.htm

✓ **Metro Frequency: 290.6**



✓ **Next Generation Radar**

- Tracks and Forecasts Storm Movement
- Identifies possible **Hail, Vorticies and Microburst**

✓ **Other Weather Offices on Okinawa**

- Kadena Air Base
- Naha Air Port



Meteorological Parameters

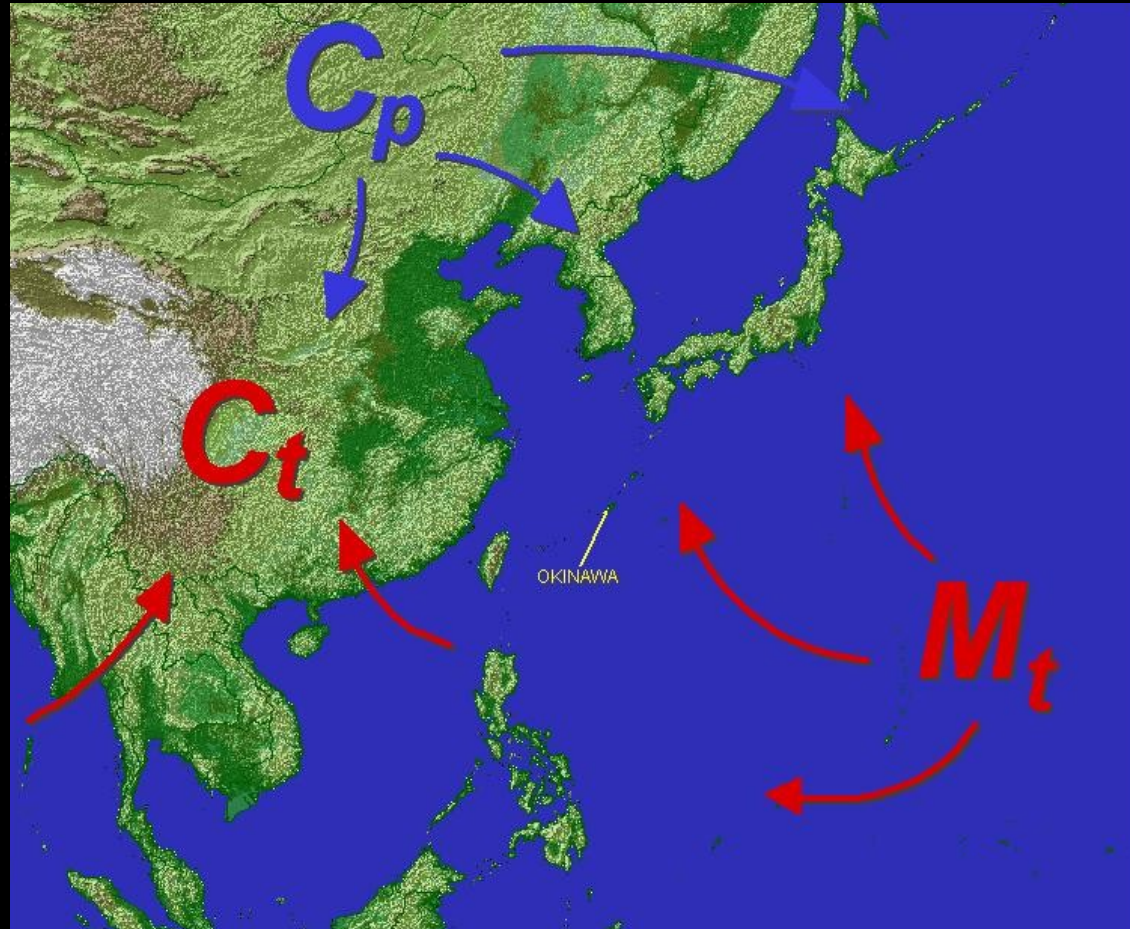


METEOROLOGICAL PARAMETERS

- ✓ Air Masses
- ✓ Fronts
- ✓ Thunderstorms
- ✓ Low Level Wind Shear

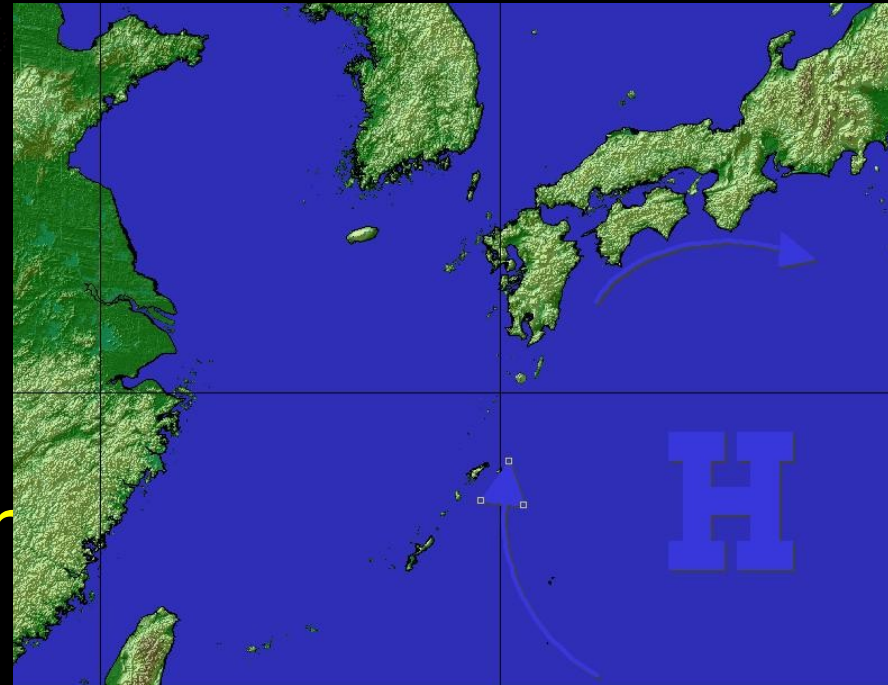
AIR MASSES

- ✓ Large bodies of air
- ✓ Similar moisture and temperature properties
- ✓ Two air masses influence Okinawa:
 - Summer = Maritime Tropical
 - Winter =



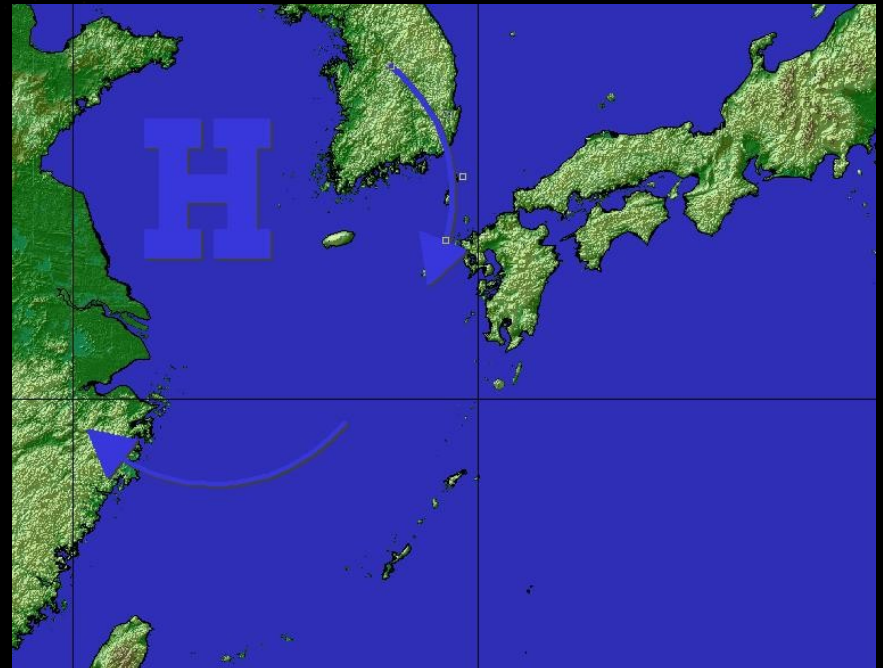
MARITIME TROPICAL

- ✓ Warm
- ✓ Moist
- ✓ Unstable
- ✓ Increased T-Storm
- ✓ & Showery Precipitation



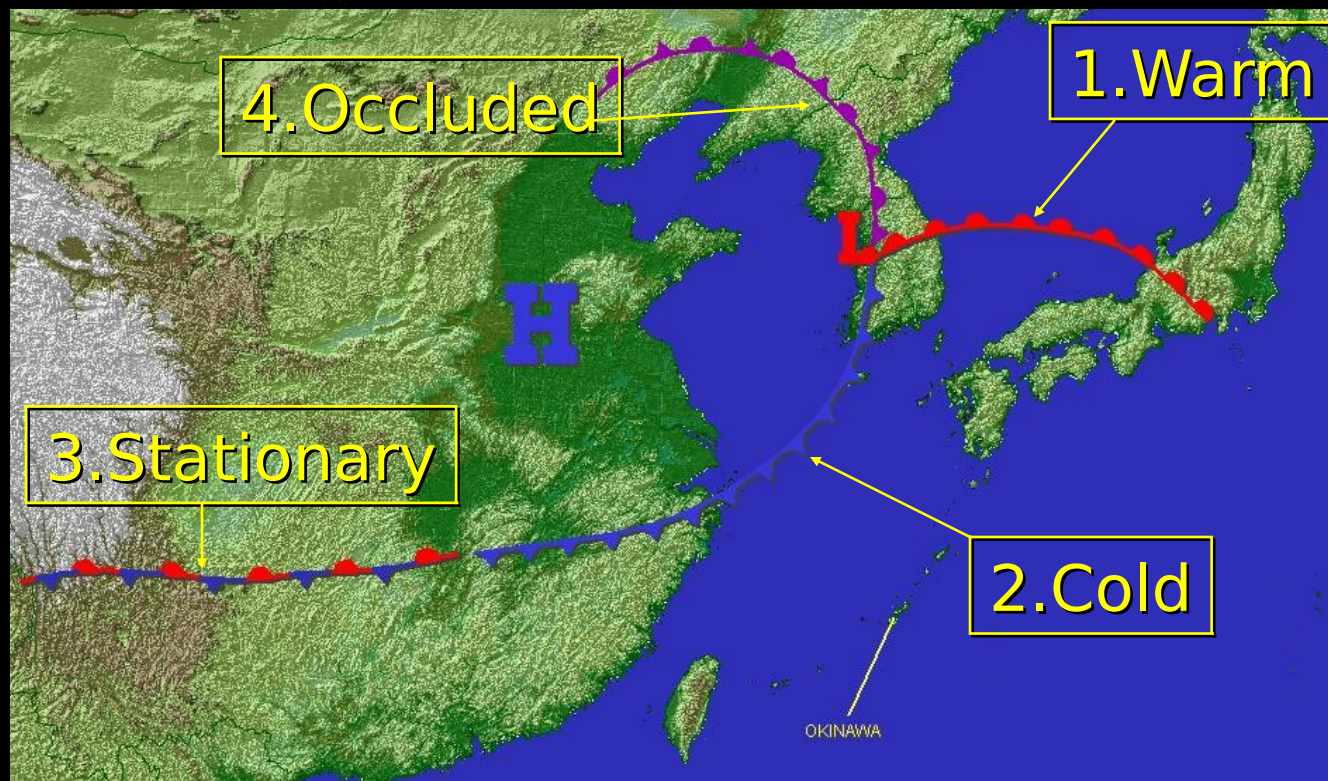
CONTINENTAL POLAR

- ✓ Cold
- ✓ Dry
- ✓ Stable
- ✓ Fewer T-
Storms



FRONTS

- ✓ Separate two air masses
- ✓ Types of Fronts (4)



WARM FRONT

- ✓ Warm air replaces cold air
- ✓ Covers large area
- ✓ Low ceiling
- ✓ Steady Precipitation
- ✓ Fog

Symbol



COLD FRONT

- ✦ Cold air displaces warm air
- ▮ Faster moving than warm
- ▮ Showery precipitation
- ▮ T-Storm potential increases

Symbol



OCCLUDED FRONT

- ✦ Caused by a Cold Front catching up and overtaking a Warm Front
- ▮ Mixture of cold and warm frontal weather
- ▮ An extension of the respective frontal boundary

Symbol



STATIONARY FRONTS

- No air is advancing
- Widespread cloudiness
- Majority of weather is on the Northern side of the front (due to lift)

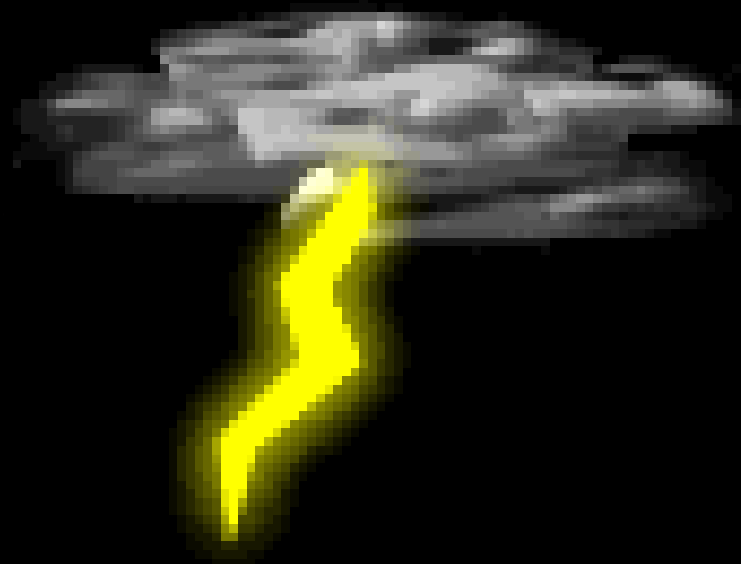
Symbol



THUNDERSTORMS

Hazards to flight:

- ✓ Lightning
- ✓ Turbulence
- ✓ Heavy Rain
- ✓ Strong Winds
- ✓ Icing



LIGHTNING

- Types of Lightning
- Lightning Hazard



Broken Arrow Ok August 27 1999
(c) 1999 Dave Crowley www.stormguy.com

TYPES OF LIGHTNING



IN CLOUD



CLOUD TO CLOUD



CLOUD TO GROUND



CLOUD TO AIR

LIGHTNING HAZARDS

- ✓ Flash Blindness
- ✓ Puncture Aircraft Skin
- ✓ Shock and Burns
- ✓ Fuel Ignition
- ✓ Damage to Equipment



TURBULENCE

- ✓ Light/Moderate/Severe and Extreme
- ✓ Most severe at or near the freezing level
- ✓ Caused by the associated air motions

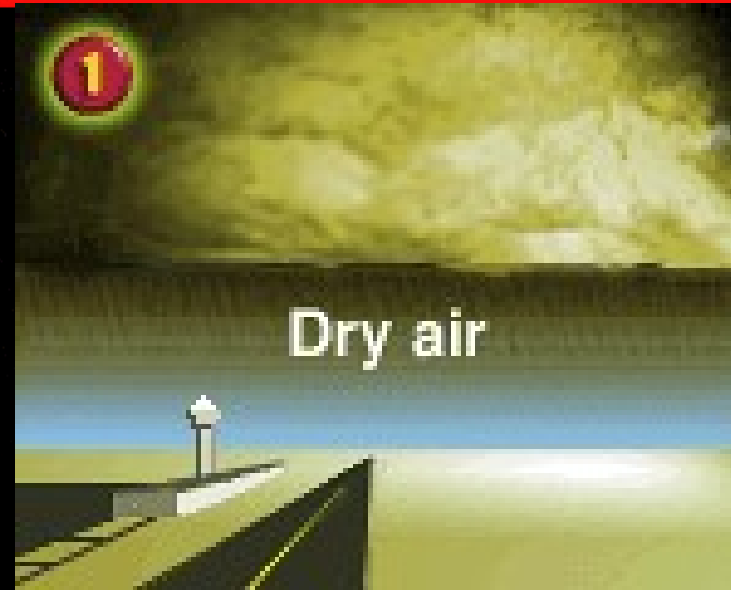
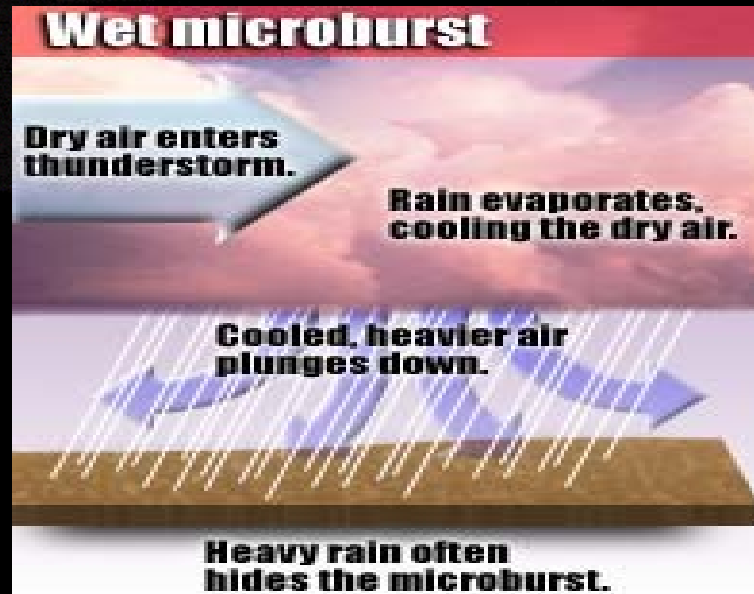


STRONG WINDS

- ✓ Microburst - 4 km or less
- ✓ Macroburst - greater than 4 km
- ✓ Lasts 5 - 30 minutes
- ✓ 146 knots or greater



Cause of Microburst



ICING

- ✓ Most severe icing occurs during the mature stage of Thunderstorms
- ✓ Upper half of cloud
- ✓ Updraft regions
- ✓ Clear, rime or mixed



Clear Icing

- Most Dangerous
- Glossy, Clear or Translucent
- Most common in Cumuliform clouds at temps of 0 to -8C

Rime Icing

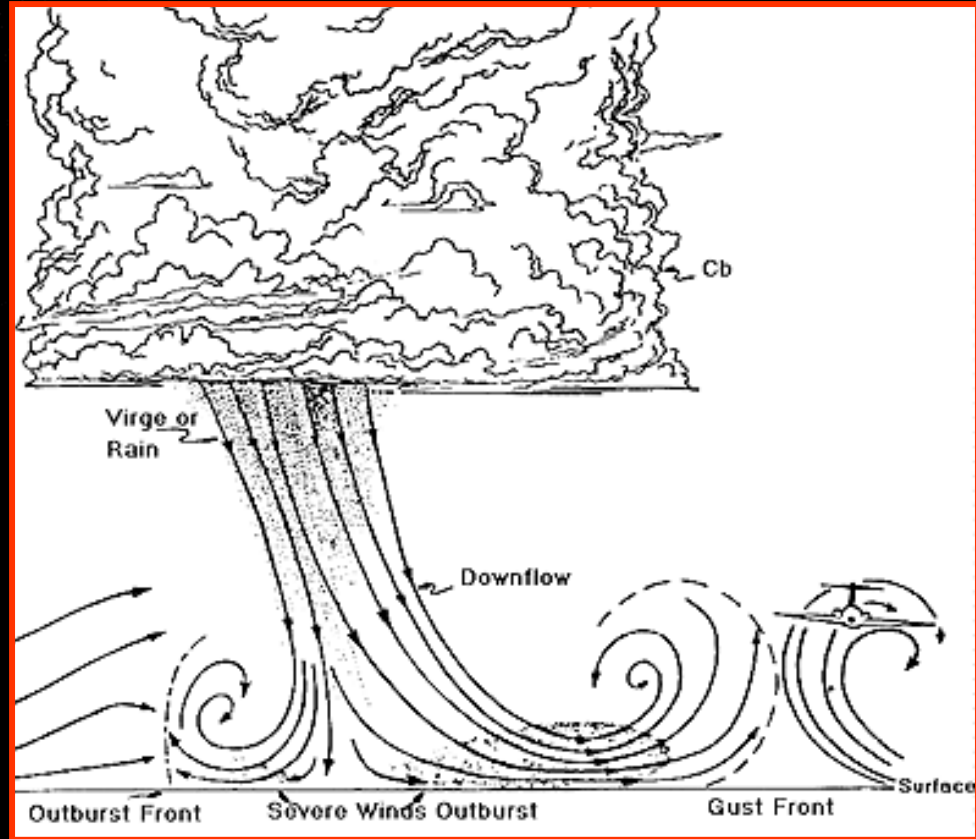
- Rough, Milky, Opaque
- Most common in Stratiform clouds at temps of 0 to -15C

Mixed Icing

- Combination of the two

LOW LEVEL WIND SHEAR

- ✓ Rapid change in direction or speed
- ✓ Head wind becomes tail wind
- ✓ Increased potential with the increase of convective cells





Avoidance Rules

AVOIDANCE RULES

- ✓ Avoid convective activity by at least 10 miles
- ✓ If not avoidable and you must penetrate use a steep ascent, and only penetrate the lower 1/3rd of the cell
- ✓ Avoid freezing level
- ✓ No formation flights



Warnings & Advisories



WARNINGS AND ADVISORIES

- ✓ Thunderstorms
- ✓ Wind
- ✓ Airmets and Sigmet

THUNDERSTORMS

- ✓ Thunderstorm Advisory
 - ✓ within 100 nm of Kadena's TacAN
- ✓ Thunderstorm Condition II
 - ✓ within 25 nm of Futenma
- ✓ Thunderstorm Condition I
 - ✓ within 5 nm of Futenma
- ✓ *Note: Conditions I and II also apply to tornadoes*

Thunderstorm Warnings and Advisories Include

- ✓ Valid Time
- ✓ Minimum Conditions
 - Ceiling
 - Weather
 - Visibility
- ✓ Maximum Winds
- ✓ Maximum Cloud Tops
- ✓ Storm Location, Direction and Movement

WIND WARNINGS

- ✓ Local Wind Warning
 - 17-33 kts sustained or gusts of 23 kts or greater
- ✓ Gale Warning
 - 34-47 kts (sustained)
- ✓ Storm
 - 48 kts or greater (sustained)
- ✓ Crosswind
 - component exceeds 15 kts



✓ **Airmets**

- Advises of weather that may be hazardous to LIGHT AIRCRAFT and VFR Flights
- IFR, Turbulence, Icing

✓ **Sigmets**

- Potentially Hazardous to ALL AIRCRAFT
- Severe Icing
- Severe or Extreme Icing
- Tornadoes
- Lines and Embedded Thunderstorms
- Volcanic Ash

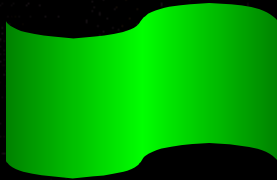


Heat Conditions

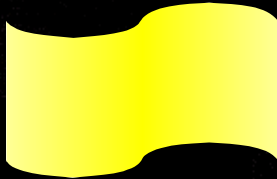
Heat Conditions

- ✓ Wet Bulb Globe Temperature Index (WBGTI)
Calculated from May 1st – October 31st
or when temperature equals or exceeds 82F
- ✓ MCO 6200.1D & StaO 6200.1H
- ✓ Flags located at CFR and Semper Fit Fitness Center

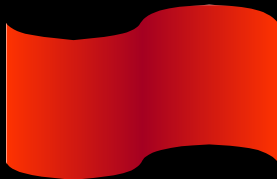
HEAT CONDITIONS



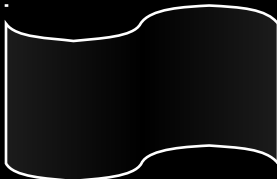
GREEN FLAG: (WBGTI 80.0-84.9) Heavy exercise to be conducted with caution for unacclimatized personnel.



YELLOW FLAG: (WBGTI 85.0-87.9) Strenuous exercise should be suspended for unacclimatized personnel.



RED FLAG: (WBGTI 88.0-89.9) All physical activity to stop for unacclimatized personnel. Acclimatized personnel limited to 6 hours activity per day.



BLACK FLAG: (WBGTI 90.0 OR ABOVE) All strenuous activity should be halted for all troops.



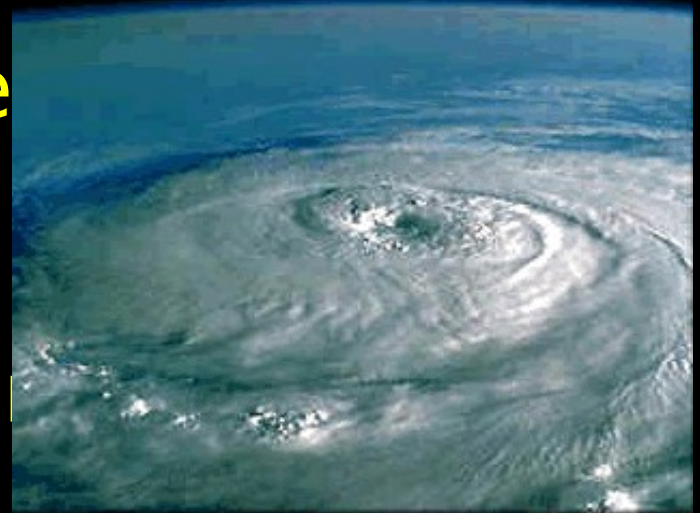
Tropical Weather

TROPICAL CYCLONES

- ✓ **1 June - 30 November**
- ✓ TCCOR set by the Commander, 18th Wing, Kadena Air Base
- ✓ CG MCB Butler and CO MCAS Futenma can establish a higher restriction level than the set TCCOR

TROPICAL CYCLONES / TYPHOONS

- ✓ Form over warm water
- ✓ Organized circulation
- ✓ 9 day average lifespan
- ✓ Originate near the equator
- ✓ Westerly or Northwestern trajectory



TROPICAL CYCLONES

- ✓ Tropical Depression: *33 kts or less*
- ✓ Tropical Storm: *34 - 63 kts*
- ✓ Typhoon: *64 - 129 kts*
- ✓ Super Typhoon: *130 kts or greater*

Conditions of Readiness

- ✓ TCCOR IV- Winds of 50kts or greater possible within 72 hours
- ✓ TCCOR III- Winds of 50kts or greater possible within 48 hours
- ✓ TCCOR II - Winds of 50kts or greater expected within 24 hours
- ✓ TCCOR I - Winds of 50kts or greater expected within 12 hours

Conditions of Readiness

- ✓ TCCOR IC- Winds of 50kts or greater expected, 34-49kt winds are occurring
- ✓ TCCOR IE- Winds of 50kts or greater are occurring including gusts
- ✓ TCCOR IR - Winds of 50kts or greater not occurring or expected, 34-49kt winds are occurring
- ✓ TCCOR SW – Danger still exists
- ✓ TCCOR AC – All Danger has passed



Weather Briefs

Weather Briefs

✓ Briefing Options

- In Person
- By Phone
- By Fax



Providing Support Around the World

